Near Detector Status & Schedule Update

R.J. Tesarek
NOvA Deputy Project Manager

Fermilab PMG Meeting
5/25/10

NOvA Schedule Overview

Near Detector Surface Building

Near Detector Construction & Assembly Status

Near Detector Schedule

Color Code

- Information/plans

✓ Good status/completed

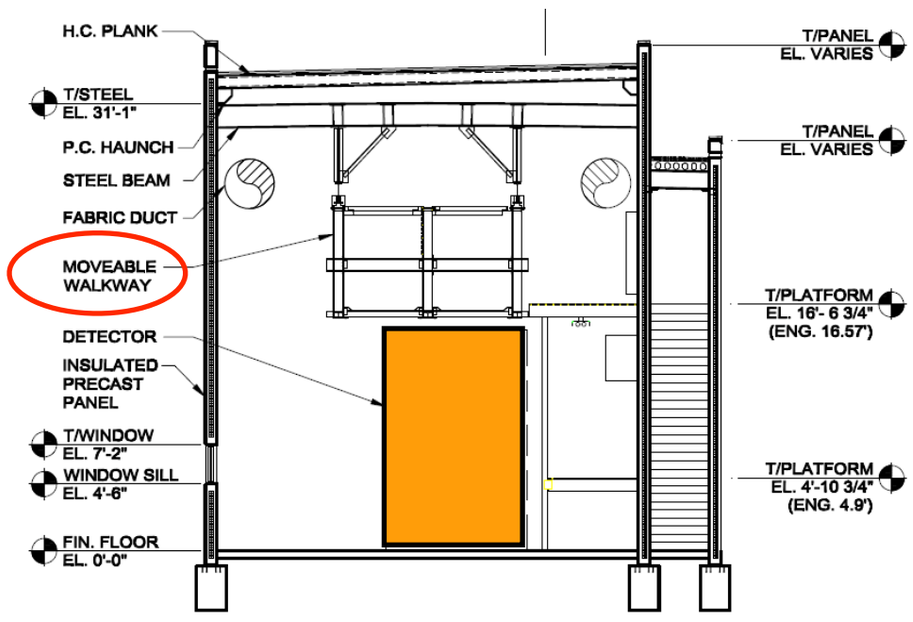
➡ Something to watch

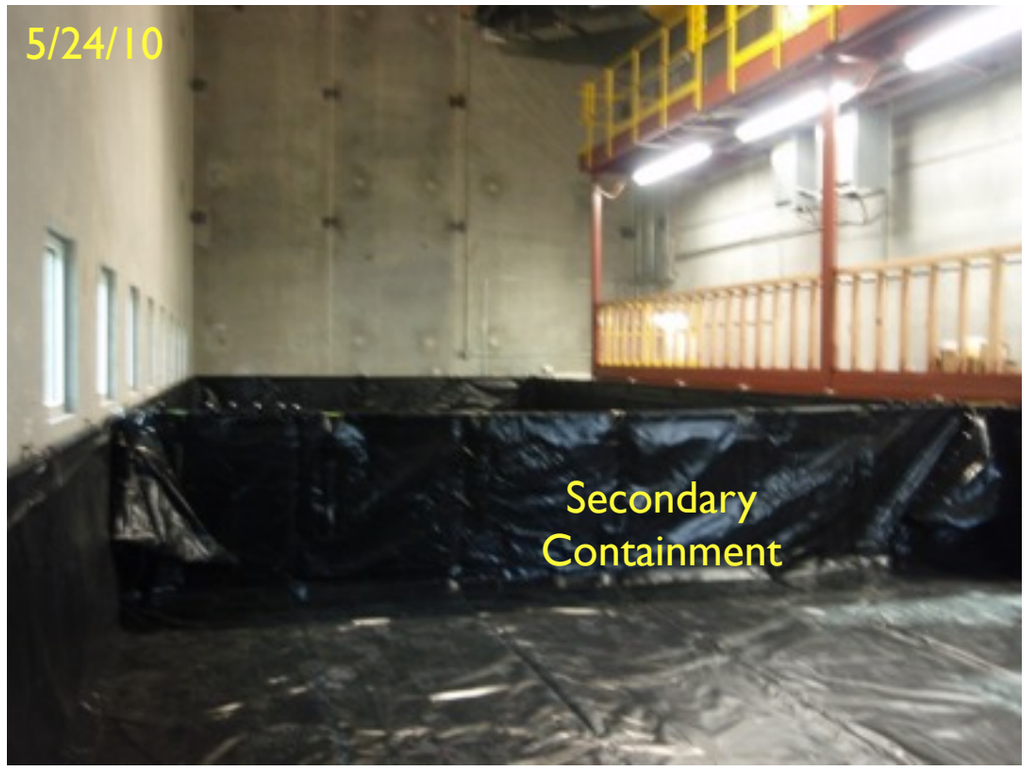
Near Detector Building

New building near MINOS service building (M.S.B.)

✓ Construction started	12/07/09
✓ Walls windows doors up	02/08/10
✓ Floors poured	02/19/10
✓ Complete stairways	02/25/10
✓ Power tie-in to M.S.B.	04/13/10
✓ Stationary catwalks installed	04/23/10
✓ Install secondary containment	05/19/10
✓ Ready for 1st block	05/24/10
➡ Movable platform installed	06/30/10

Experiment electrical work, secondary containment part of construction outfitting





Module Production

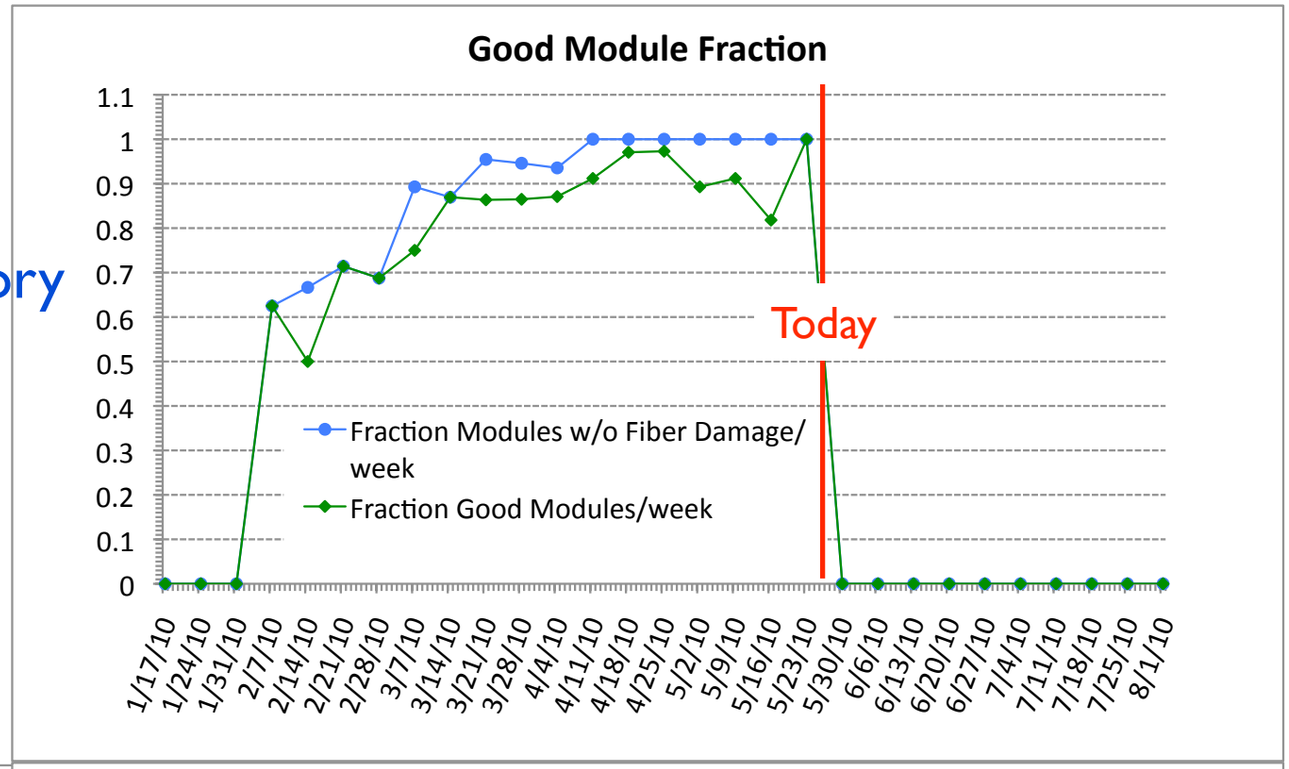
327 "good" modules produced

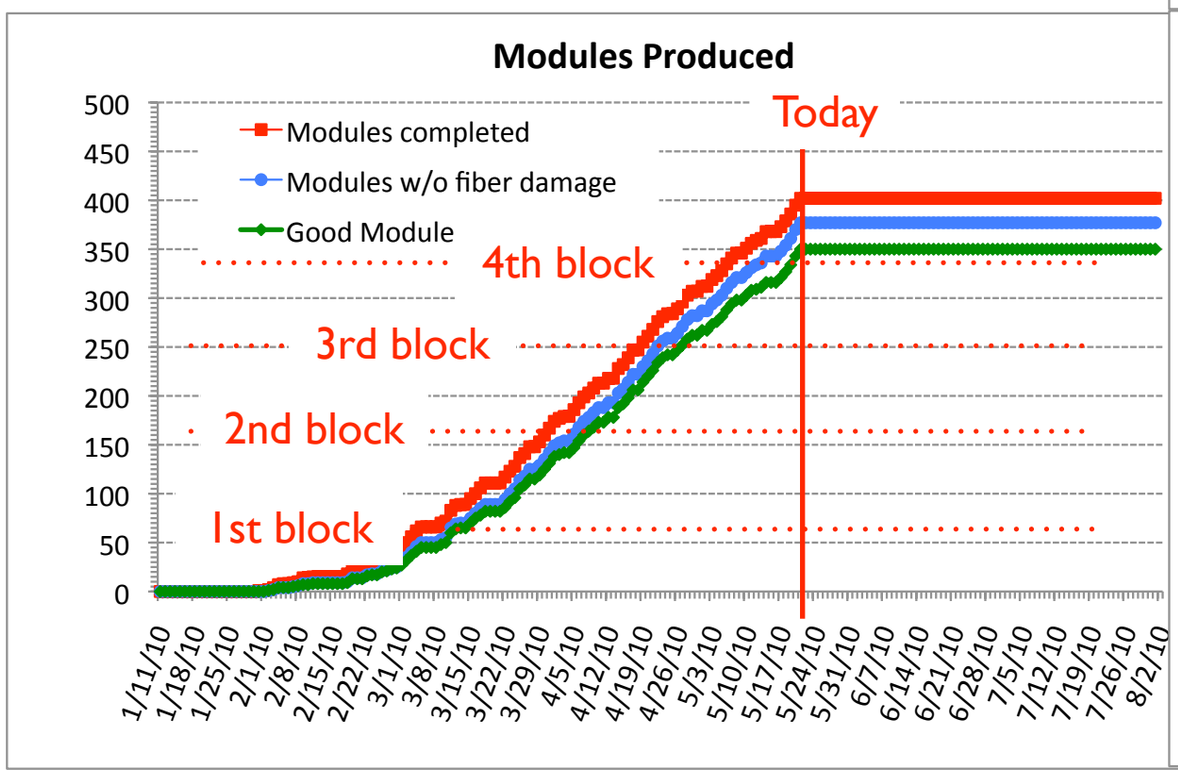
Assumptions

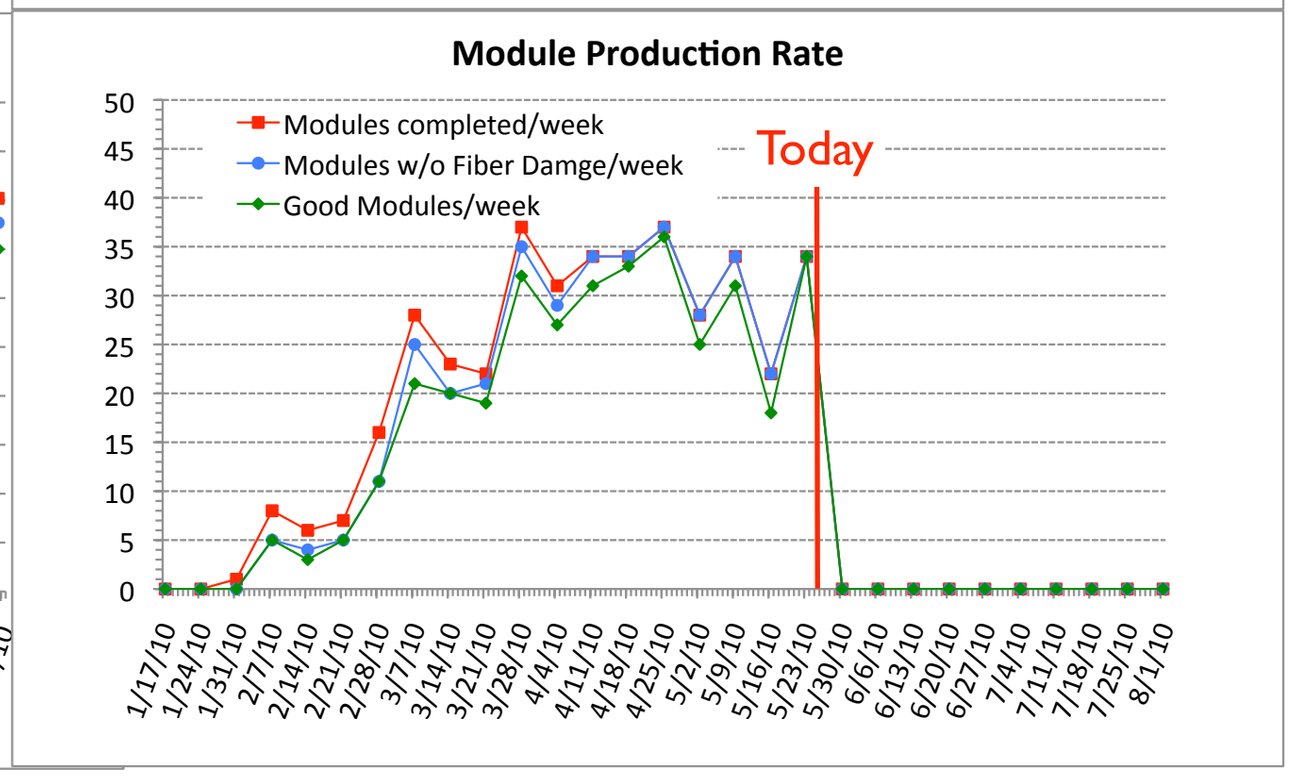
- Block = 83 modules (10% spare)
- "good" modules: no fiber damage, Factory QA/QC

Production Rate Analysis (RJT)

- Rate, 8 wk avg (29/wk, "good")
- 4 blocks of modules (332) 5/24/10
- 5 blocks of modules (415) 6/14/10

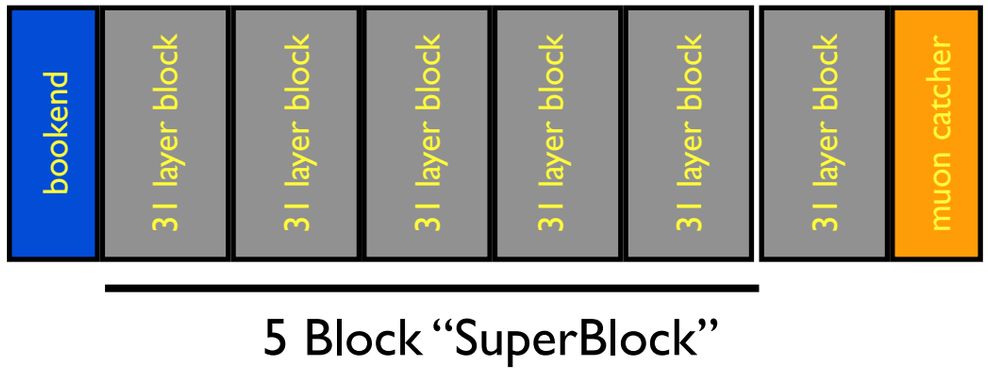






Near Detector Assembly

Near Detector Schematic



Prototype near detector block(31 planes)

- ✓ Glued prototype assembly completed 2/11/10
- ✓ Arrived in MINOS service building 3/16/10
- ✓ Assembly rate ~1hr/plane (2-3 modules/plane)

Near Detector block assembly

- ✓ 1st detector block completed (4/7/10)
- ✓ Leak tests and fiber test for all modules in block at ANL
- Need to paint production blocks black

Muon Catcher Design

- ✓ Engineering complete (4/29/10)
- ✓ Steel plates ordered (4/1/10)
- ➡ Parts for support structure not yet ordered


1st Near Detector Block
5/24/10

Scintillator

Minearal Oil

✓ PO for all NOvA mineral oil(~3,000,000 gal)

Waveshifting Powders

✓ All powders in hand for detector scintillator (5/21/10, for both near and far detector)

Blend scintillator for Near Detector

- Need ~30,000 gallons for Near Detector

✓ Mineral oil supplier selected PR in procurement
✓ 60,000 gallons + options for full 3,000,000 gallons
✓ Selected 2 toll blenders to blend 30,000 gallons each (5/7/10)
✓ Pseudocumene for Near Detector in hand

- Blend in early June

Blend scintillator at FNAL for vertical slice 5 (full size module)

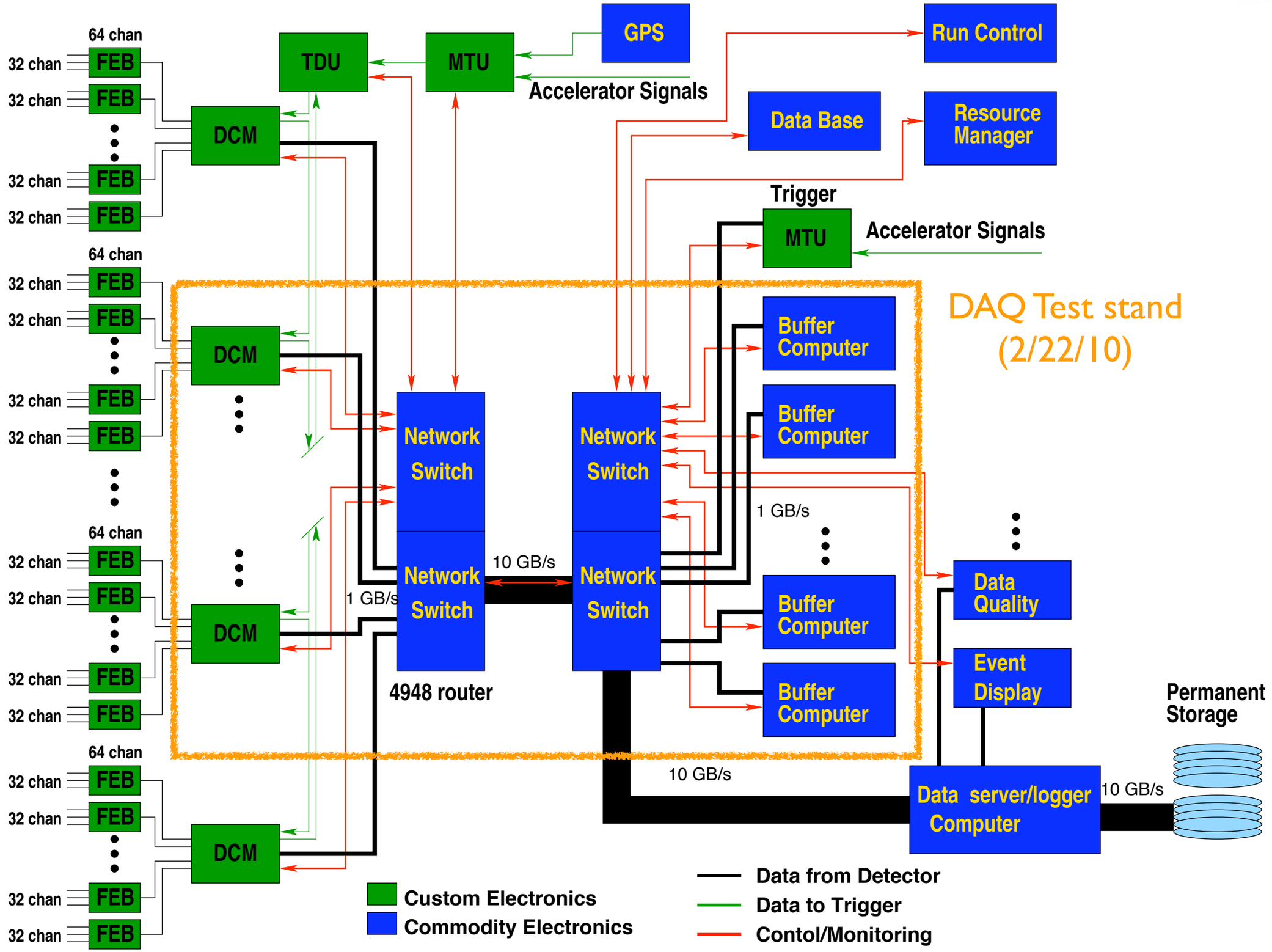
✓ Filtered fluor blend made into scintillator (5/19/10)

- Scintillator at IU for tests

Near Detector scintillator distribution system (J.Musser, W.Fox, D.Pushka)

- Engineering design complete
- Begin procuring parts

NOvA Electronics/DAQ Overview



DAQ Test stand (2/22/10)

Electronics

Avalanche Photo Diodes (APDs)

- ✓ First 20 APDs arrived (3/11/10)
- ✓ Dark currents very low (agree with Hamamatsu measurements)
- ➡ Production APD delivery 7/29/10
- ➡ 4 block milestone delayed!

Front End Board (FEB) v4

- ✓ PCB fabrication began(3/5/10)
- ✓ 5 FEBs in hand (4/1/10)
- ✓ FEB/DCM communication tests (April)
- ➡ Production quantities begin arriving in June

Data Concentrator Modules(DCM)

- ✓ Prototype DCM (4) in DAQ test stand
- Expect DCMs for the near detector this week (5/25/10)
- ➡ Problems with DCM connectors (temporary solution identified)

Time Distribution Units (TDU)

- ✓ 2 boards stuffed, checked and booting
- ✓ TDU Daughter boards boot(5/24/10)
- Firmware development/tests underway
- ➡ Expect TDUs for the near detector in late June, early July
- ➡ FEB-DCM-TDU tests begin in mid July

DAQ/Networking/Computers

- ✓ All DAQ computers in hand
- Install software in Control Room computers (early June)

Power Distribution

- ✓ HV/LV power supplies ordered (3/5/10)
- ✓ Prototype Power Dist. Board (3/15/10)
- Boards in production
- PDB ready for installation end of May

DAQ Software

Significant replanning of tasks (P.Shanahan)

- ✓ Re-planning completed
- DAQ schedule completes "just in time" for IPND milestone

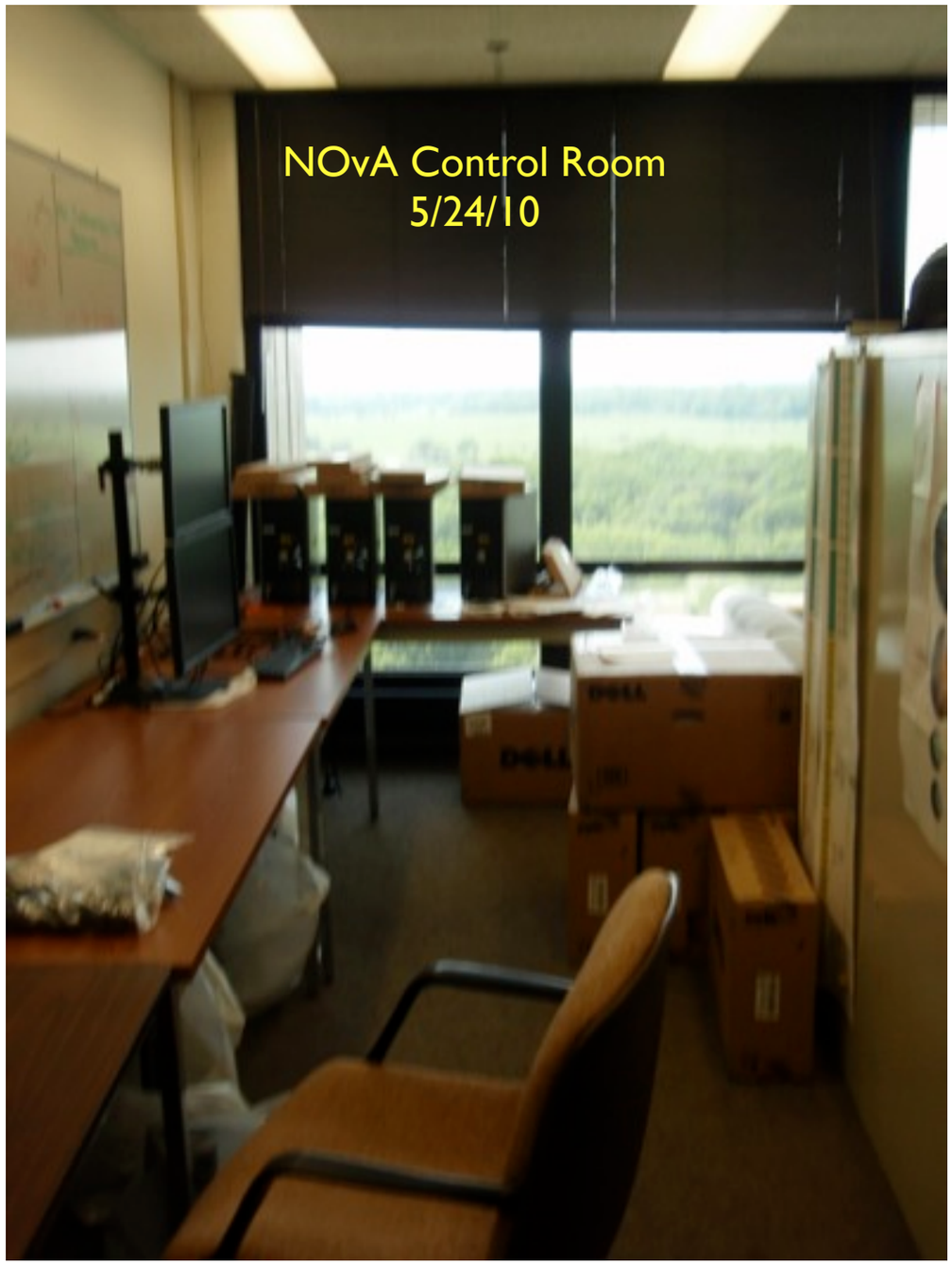
Software

- ✓ DAQ specifications complete
- ✓ Software framework/external software packages complete
- ✓ Event structure/event building emulation complete
- ✓ Run Control State model defined
- ✓ Send simulated data from DCM to buffer nodes
- Simulated data complete chain test 1 DCM to 1 buffer node to data logger(mid May)
- Real data complete chain test multiple DCM to multiple buffer nodes to data logger (end May)

Control Room

Detector controls

➡"No progress", needs advocate



NOvA Control Room
5/24/10

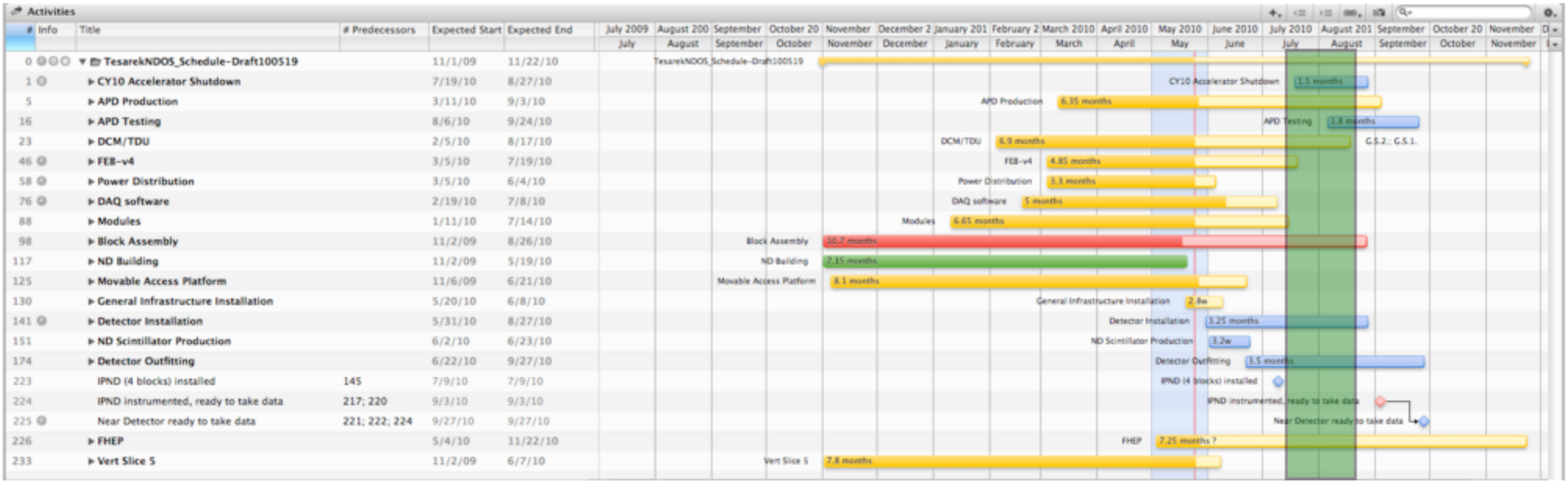
Near Detector Score Card

Item	Qty needed	Qty in-hand	Units	Fraction (%)
Detector Modules	497+spare	327		65.8
Detector Blocks	6.5	1		15.4
APDs	550	20		3.6
FEBs	550	5		0.9
DCMs	16	16		100.0
TDUs	4	2		50.0
HV supplies	3	0		0.0
LV supplies	7	7		100.0
Power Distribution Boxes	14	(1)[1]		0.0
Power Distribution Cards	240	(20)[1]		0.0
Scintillator	30,300	(4,500)[1]	gallons	0.0
Buffer Computers	16	16		100.0
Network Switches	2	2		100.0
Control Room Computers	5	5		100.0
Special Purpose Computers	4	4		100.0

Quantities for near detector + spares

[1] prototype components

Near Detector Schedule



Today

CY10 Shutdown

Aggressive schedule to maximize data w/ near detector

➡First block active mid August

- IPND(4 blocks) ready to take data 9/3/10 (-39 days float for milestone)
- Working with Hamamatsu to advance delivery of APDs
- Full Detector ready to take data 3 weeks after IPND milestone

NOTE: Scintillator production is *NOT* in the schedule

Overview of Major Milestones

My projections based on input from managers

Near Detector Surface Building ready for near detector	5/19/10
332 modules complete (4 blocks + spares)	5/24/10
1st detector block installed	6/04/10
4th detector block complete	7/08/10
4th detector block installed	7/09/10
1st detector block filled with scintillator	7/14/10
All detector modules complete	7/14/10
1st detector block w/ instrumentation (~20 modules)	7/21/10
4th detector block filled with scintillator	8/03/10
1st detector block fully instrumented	8/12/10
100 APDs arrive for testing	8/06/10
6th detector block installed	8/20/10
Muon catcher installed	8/27/10
4th detector block ready to take data (IPND)	9/03/10
Muon catcher filled with scintillator	9/13/10
Near detector ready to take data	9/27/10

Summary

Considerable progress for Near Detector since Jan. collaboration meeting

- ✓ New near detector building is complete
- ✓ All near detector extrusions in hand
- ✓ All near detector WLS fiber in hand
- ✓ >327 modules produced of both types(H-thin wall, V-thick wall)
- ✓ 246 modules at ANL (~80 for block assembly)
- ✓ 1st near detector block complete
- ✓ FEB production prototypes under test
- ✓ DCM/Buffer computer test stand for software development

What to watch

- ➡ APD delivery/testing schedule
- ➡ Electronics delivery/testing schedule
- ➡ Detector controls (slow monitoring)
- ➡ Muon Catcher procurement/assembly

Other progress

- Most FHEP block pivoter parts in hand (waiting for component lifting fixtures)